

MEMOIRS 1965

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EXTRACTS from OLD EDITIONS of the MINING JOURNALS

Arkengarthdale, Grassington, Craven Moor and Other
Mines in the Yorkshire Dales.

J.R. FORSTER-SMITH. F.G.S., M.I.M.M.

A ROYAL VISIT TO THE ARKENGARTHDALE MINES

Extract from a letter written by John Dolphin Esq., of Hunter House, Riding Mill, Northumberland, dated 12 February, 1853.

The letter first describes the mining enterprises commenced by Mr. [10] Frederick Hall, at the Derwent mines, Durham. It then goes on as follows:

I was his elevee in very early youth, and from his instructions I received the first rudiments of geology, mineralogy, scientific and practical mining, and mine surveying, and of him I shall ever retain, so long as memory holds her seat, the most grateful remembrance of his extreme kindness in my boyhood, and continued friendship in after life. He has long been remembered with the dead, but his memory is still cherished by a numerous body of miners, as one whose liberal disposition and attention to the welfare of every man in his charge showed that he was truly and emphatically the miners friend.

He originated the Miners' Fund: at first confined to his own districts, has since spread over and been highly beneficial to many other districts. He devised and erected the first crushing mills, to supersede the old method of breaking down ores for cleaning by hand labour, called buckering. He substituted the square tub and brake-sieve for the old woman's round tub and hand sieve. He improved the ancient method of smelting, and substituted horizontal chimnies for upright stalks, to save fume containing much lead from escaping into the air, that was otherwise only wasted, and spread destruction around amongst the herbage of the neighbourhood. By his improvements was added nearly one twelfth to the former produce of lead.

I shall have to speak of Mr. Hall again when I come to describe the Arkindale mines, where his improvements were first begun, which excited much attention, and even attracted the notice of Royalty.

The Prince of Wales, and the Duke of Clarence, being on a visit to Lord Dundas, at Aske Hall, near Richmond, determined upon honouring Mr. Hall by inspecting the Arkindale mines. The Duke of Clarence, accompanied by a large party accordingly went into the mines about three hundred fathoms, by an adit level; saw and wrought himself some lead ore from a rich vein, recently cut. He afterwards inspected the machinery, inclined planes, crushing mills, washing floors and apparatus; and the splendid, roomy, airy smelting mill, with its large horizontal chimneys, fume houses, roasting houses, etc., and, after partaking of an elegant luncheon with Mrs. Hall, at Eskeleth House, departed, highly delighted with his visit. The Prince of Wales did not go,

being detained at Aske Hall with a slight indisposition. Mr. and Mrs. Hall had afterwards the honour of an invitation to meet him at Aske Hall, and accompanied him and the Duke from thence to inspect the great ironworks at Low Moor, near Bradford.

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GRASSINGTON MINES

From a letter to the Editor, entitled, "Lead Mining Districts", dated 11 September 1837.

[11]

Nearly all the mines in the Riding are on the range of hills between Pateley Bridge and Buckden; those lying near Pateley, or towards the southeast border of the mining district, are the Cockhill mines, held by lease, of Sir Thomas White, and the Providence, Prosperous and Merrifield mines. These three are all on the same vein and worked by one company – the two former of them are on the lands of Sir Thomas White, and the latter on those of John Yorke Esq. The above mines, with numerous small grants, generally carried on by poor miners who work in them, have for some years produced about 1,200 tons of pig lead per annum – for the present year there is likely to be a falling-off in quantity, the Providence and Prosperous mines not being so productive as for many years past.

A few miles north-west of the above are the Grassington mines, on His Grace the Duke of Devonshire's property, and most of them worked on his own account. These mines are producing about 700 tons of lead per annum. The lead raised from all the other little mines in the Riding may be estimated at from 100 to 150 tons per annum. The ores from the Pateley district are smelted on or near the mines, in ore hearths, or open blast furnaces, and those from the Grassington district in reverberatory furnaces. None of the ores contain sufficient silver to pay for refining.

Signed. Y.Z.

29th January 1838. To the Editor of the Mining Journal.

Sir, You were so kind as to insert a letter of mine some time since, on the mineral district of the West Riding of Yorkshire, in which I promised to give you, at a future day, a more detailed account of the lead mines in this district. I now beg to hand you the following statement, taking the mines in the order in which they were named in that letter:-

The Cockhill mine. The workings on the different veins in this mine are in the Carboniferous limestone, which rock is thrown up very abruptly in this place to the surface; it dips very rapidly on every side, and is succeeded by a thin bed of plate, or shale, on which rests a bed of gritstone eight fathoms thick; alternate beds of plate set on in succession. The mine is drained to a

EXTRACTS FROM OLD EDITIONS OF THE MINING JOURNALS

certain depth by a day level, termed the "Horse level". This level is about two miles in length, exclusive of its branches; some of them of great length. It was driven southwards a considerable distance through plate and grit, and then continues a great number of fathoms into the limestone before any productive veins were intersected. On some of them it has been extended eastward into the above-mentioned eight fathom bed of grit. There are several veins in this mine and they have a considerable hade or underlie, some to the south and some others towards the north. These veins have also a considerable throw of the strata, that is, the beds on one side of the vein have been raised or depressed from the range of the corresponding strata on the other side), in some instances as much as twenty fathoms. Those underlying towards the north having the strata in the north (or hanging) side that distance below the corresponding beds on the [12] opposite side, and those hading towards the south have the south side strata down. There has been little, if any, ore found in the strata above the limestone, and the veins are generally so small in the plate that it is with difficulty they can be traced through it.

The ancients worked some of these veins extensively, and no doubt found them very productive. In some places, by taking advantage of the dry seasons, they got to the depth of from 60 to 70 fathoms, and drew the water and stuff to the surface by horsepower. Some of these workings must have been made before many of the tools at present used by miners were introduced, there having been found in late years wood shovels, leather bags, etc., the latter were no doubt used (from the iron work about them) in place of kibbles. The greater part of the present workings are below Horse level; the water is pumped to this level (a depth of from 15 to 20 fathoms) by a nine-inch cylinder steam engine, fixed underground, near the extreme point of the level; the smoke and waste steam is conveyed through pipes, old workings, etc., to surface a perpendicular depth of upwards of 60 fathoms. The bouse and deads, ("work and attle") is taken through the level in wagons drawn by horses.

The Providence, Prosperous and Merryfield mines are all on one large vein, running nearly parallel with the Cockhill veins, and about one and a half miles to the north of them. The present depth of these mines is about 70 fathoms from surface. The water is pumped to the day, or adit level by a small steam engine and two water wheels. The underlie of this vein is not great, but the throw of the strata is from 15 to 20 fathoms; the beds on the hanging side being that distance below the strata on the hading or footwall side.

The vein has been very productive in the three mines, in the very beds which have not produced ore in the adjoining mine – Cockhill; that is, in the grits and plate, generally yielding good ore, with grit on one side of the vein and plate on the other. The deepest part of these mines has reached the limestone (supposed to be the top bed of the Cockhill series), but I am not aware that any trial has yet been made on the vein in it.

The Grassington mines are about five miles west of the Providence and other mines mentioned, on the same run of veins. These mines are scattered over an extensive tract of moorland. The veins and branches are very numerous. The water is taken off this district, even below the present workings, by means of a day level, which was commenced about the year 1796, under the direction of Mr Flint, the then Mineral Agent of His Grace the Duke of Devonshire. This level, which was completed in 1830, is a mile and a half in length (independent of a long branch), and about 70 fathoms deep from surface. It was originally intended for the double purpose of draining the mine and as a boat level for the conveying of all the stuff from the works. With this intention it was driven nine feet high and five feet wide, up to the year 1818, when John Taylor Esq. undertook the management of all the mines belonging to the Duke of Devonshire. This gentleman, taking into consideration the very great expense of driving a level this size through hard ground, [13] and seeing that after it should be completed the cost of taking all the bouse and deads a distance of a mile and a half in boats would far exceed that of drawing it to the surface by horse, or other power, particularly as the average depth from which the stuff is drawn does not exceed 30 fathoms, caused the level to be driven from that time the usual size.

The strata is alternate plate and gritstone to a certain depth, when it is underlain by limestone. There is not that uniformity of strata in this district that is to be found in many parts of England, particularly in the great lead mines north of, this place, but taking a line across the veins, through the most productive ground, the beds may be taken in the following order: Top Plate, 5 fms. thick; Top Grit, 6 fms. thick; Plate (including a bed of coal 6 ins. thick), 3 fms. thick; Bearing Grit 16 fms. thick; Plate with tumblers of limestone, 9 ft. thick; Top Limestone, 4 fms. thick; Plate 2 feet thick; Limestone, thickness unknown.

The Bearing Grit, has been by far the most productive stratum for lead ore, the Top Grit has at times produced good bunches, and in a few instances, where the veins have proved rich through the grit, ore has been found a few feet into the Plate. In the Plate between the two grits the veins are generally heaved, or shifted, nearly in a horizontal direction for 2 or 3 fms., the only trace being a thin seam of "dour" or "fluccan", an inch or two thick – a good argument this for your correspondent, the "Cornish Miner", against the theory of veins being filled from below by internal pressure. The veins in the limestone are less soft and more regular than in the grits, and generally of a more promising appearance, containing fluorspar, calcarious spar, barytes, calamine, etc., but hitherto very small quantities of ore have been found in it, although several of the veins have been extensively explored to a depth of 30 fathoms into limestone. The veins underlie on an average but a few inches in a fathom from the vertical. Here, as at Cockhill, Providence and other mines, the strata in the hanging side is lower than the footwall, but the disruption does not, (with very few exceptions) exceed a few feet, and only in one or two veins has ore been found, (as in the Providence and the

two mines adjoining), where the throw is so great as to raise or depress the strata on one side, so as to cause plate and grit to be on a level with each other. The strata dip to the east, and some of the veins have been extended in that direction, in the Bearing Grit, some distance. The Top Plate in the eastern part of the moor attains a considerable thickness, and the veins are found much contracted, hard and poor.

In the small mines, west of Grassington Moor, the ore has generally been found in limestone, as in the Cockhill mine.

It will be seen from these details, that but very slight analogy exists between the circumstances which influence the productiveness of the veins in the different mines with regard to the strata; the only general coincidence is that the bunches of ore hitherto discovered in the several mines can be clearly traced to the cause of bunches dropping into or intersecting the veins.

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I may have carried this letter into unnecessary length, but my endeavour has been to give a plain statement, in such terms that it may be fully understood by your numerous readers, and should you deem it of sufficient interest to be worthy of a place in your columns, I shall feel obliged by your giving it an early insertion.

Y.Z.

(We insert the communication of our correspondent with pleasure, and doubt not that it will have the effect of inducing others to communicate the results of their observation. In doing so they would contribute to the usefulness of the Journal, in rendering it the medium of conveying information of mining pursuits in other mineral districts than those to which our attention has heretofore been more particularly directed.

Editor Mining Journal.

18 January 1851

Grassington Mines. An immense piece of rich lead ore, weighing upwards of 25 hundredweights was last week brought to surface at Grassington mines, Yorkshire. It is from the Devonshire vein, and an excellent specimen of the constituents, not only of that, but of lead veins in general, and as such will form an interesting feature at the Industrial Exhibition.

(Note This specimen may still be seen at the Geological Museum, South Kensington.)

CRAVEN MOOR MINES

8 December 1855 These mines comprise a large area of ground, in Carboniferous limestone, near its junction with the Millstone Grit, a situation noted as being congenial for lead ore deposits. It is traversed by a large number of flat and vertical veins, bearing lead ore.

The flat veins have been extensively worked by the "Old Men," and from the excavations made, and the pits sunk on them, no doubt they obtained much ore. Many of the vertical veins have also been worked by the "Old Men," but from the surface to water level only.

On these mines it may be seen that the number of veins exceed thirty, but as yet operations for working them below water level have been confined to one east and west vein, and here a steam engine for pumping, drawing and crushing has been erected, and a shaft sunk to a depth of 30 fathoms from surface. About three fathoms from this level, the vein can be seen in the shaft, where it is small and not very rich.

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In the 30-fathom level this vein has been driven upon, east and west, about 95 ft. each way. The vein here is productive, but is disordered by a pinch of ground. This promises to open out again shortly, when a bunch of lead ore may be expected. The vein east is present, but poor in this level.

The sump of the engine is 15 ft. below the 30-fathom level, and here the vein has greatly improved, being 30 inches wide, with rich stones of ore throughout. I broke some weighing from 12 to 14 pounds each. The vein in the bottom is better than I have seen it in any part of the mine. It is here a well-defined, bold, masterly vein, and shows every appearance of continuing in depth, and of being more productive than in the shallow levels. This part of the mine should be prosecuted with vigour, as they expect shortly to cut another known vein.

At Lupton's shaft there is a fine vein, from which good lead ore has been broken, but at present the works upon it are on a limited scale.

A deep adit has been brought up some hundreds of fathoms, a great part of this distance on a flat vein, which varies in thickness from a few inches to ten feet. From this vein large quantities of lead ore have been removed by the "Old Men." This vein is cut out by a vertical vein, about 20 inches wide, carrying lead ore in its whole distance from its junction to the present forebreast. The old backs give sufficient proof of its former richness, but towards the present company's workings, it has been disordered by two cross veins of spar (calcite and fluorite), and was almost barren. It has now begun to bear ore again, and opened out from about 6 inches wide to 2 ft. 5 or 6 inches, of which 6 inches is solid lead ore, In this level they are just

commencing to stope upon a fine branch of ore, about 9 inches wide, which continues for a few fathoms.

(The above notes were extracted from a long report written by Mr. George Henwood on 17 November 1855).

8 December 1855

At Blackhill level they have a vein, 26 inches wide, of rich ore.

At the Engine shaft, the vein is 10 inches wide, with a considerable quantity of ore, which increases as it gets deeper.

At Bell's shaft the vein has yielded some ore.

The total number of men and boys employed on the mine is 99.

8 March 1856

The Blackhill level has been driven about 60 feet since last meeting. The vein is rather wider, but yields about the same quantity of ore as before.

The Engine Shaft has been sunk about 4 fathoms, and the vein is improved here. All the appearances at the mines are favourable.

[16]

6 January 1859

Derby shaft workings are standing. Hargate End vein is opening a drift in the 47 fathoms level west, where the ground continues hard, with good ore mixed in the vein. In the 42-fathoms level in this vein, we find good ore that the Old Men have left, and which will pay for working. In the drift west of King's sump, in the 56-fathoms level, and east of Derby shaft, a metal pitch is working at £7-10s. per ton, while at King I s sump, a pitch is working at the same price. The crosscut to Woodhouse vein, in the 42-fathoms level, south-west, we have now opened out 330 feet, and the drift continues to be full of rubbish. In Longthorn's vein, the 42-fathoms level east continues to be hard, and there is no ore. In this level west the vein is also hard, with no ore. In the roofs above the 30-fathoms level west in this vein, the vein is mixed with ore, while in the stopes above this level east, there is good ore. In Blackhill level, another metal pitch is being worked at £7-10 1/3. per ton. Report by William Barron.

22 January 1859

In Hargate End vein, the workings continue to give good ore at the 47-fathoms level, also in the 56-fathoms level in places. Longthorn's vein, in the 42-fathom level east has some good ore, but on the west side it is hard and poor. Woodhouse shaft is now opened, and they are erecting a whimsey there. — William Barron.

12 February 1859

The present company started work some years since, and although they spent much money and carried out much work, they had but little success until Mr. Evan Hopkins inspected and reported upon the mines, recommending that the company we working in the wrong place, and that they should start anew at another place. Since that time, the affairs of the company have prospered, and the mines now seem on the way to success.

19 February 1859

The 47-fms. level in Hardgate End vein continues to produce good ore, while the 56-fms. level end west is still poor. The 42-fms. level in this and Longthorn's veins is mixed, some places being hard and poor, while others produce good ore. William Barron.

12 March 1859 Report by Mr. Evan Hopkins

In my last report, dated 30 October, I stated that the new (Derby) shaft was being sunk at about the centre of five veins — Woodhouse, Hardgate, Longthorn, Gin Shaft, and North veins — as represented in the transverse section; and that the Hardgate and Woodhouse veins had been wrought by former miners to the depth of the 42-fathoms level, and in some places still deeper, especially near the joint water level. I further observed that the ore ground now standing in the Hardgate vein was below the 42-fms. level, and [17] that the shaft, when it reached the 47-fms. level, would begin to lay open productive ground to the west. Since that time the shaft has been completed to the 47-fms. level, and ore ground has been opened out under the 42-fms. level west, where parties are now being employed in driving and stoping in the Hardgate vein westward. The Bed level above (the 42-fms. level), is also being reopened at the rate of about 60 feet per month, and is expected to reach productive mineral ground in the course of about three months. This level is intersected by several cross clay veins, running more or less north and south, which have dislocated both Hardgate and Longthorn veins for several feet, and have apparently rendered the veins for many fathoms on the west side of the joints, broken and unproductive. It is therefore necessary to extend the levels beyond this barren band to reach the productive ground westward. These cross clay veins contain lumps of lead ore in places, and should be opened for a few fathoms, as they may lead to the discovery of side branches, more especially where the main veins are broken, such as the Hardgate and Longthorn veins. There is a large piece of unproductive ground in the Hardgate Vein, opposite the shaft, at the depth of from 43 to 48 fathoms, consequently it is essential to sink this shaft without delay, to the 56-fms. level, (the water level), so as to get at the ore ground which is seen under the barren part in the 56-fms. level, driving west towards the shaft. At a corresponding depth in Longthorn vein we see a similar band of hard, unproductive ground in the 42-fms. level crosscut, immediately under the rich bunch of ore; therefore it is not advisable to drive many fathoms through this hard, barren part of the vein. It is preferable to drive an intermediate level in the bottom of the bunch above, and another level in the ore ground

below the 56-fms. level, and leave the barren part to stand between. The general appearance of Longthorn vein in the workings below the 30-fms. level is exceedingly favourable. The vein in places is very wide and branchy, and variable in its underlay. Some good branches of ore may be still standing further north, at the level of the 42-fms. level crosscut. I should therefore recommend a trial for a few fathoms in the clay vein seen to the west of the crosscut; it would not cost much, and may lead to good results.

I inspected the joint water level from the Craven Moor to the Cockhill mines, and came out at the mouth. I saw that there was a great deal of ore ground standing in the Hardgate vein, above the water level, to the east, which will become immediately available when the shaft is completed to the required depth. The other veins to the north, (which are all more or less standing below the 30 fms. level), can be explored westward from the deep level in the lower range of productive ground. Hence the necessity of completing the shaft as soon as possible, so as to place the mine in a proper condition to develop the veins under the old workings, and westward towards the unbroken ground, as well as eastward under the Grit.

30 April 1859

Derby shaft has been sunk for 2 feet since last report, and the underlie of the vein has changed; it is now 4 feet to the south, with a little ore. The 42-fms. level is opened. out to the new ground, which looks hard, with a little ore in it. I hope this will improve as we drive west. There is a little ore in the 56-fms. level.

[18]

The above are the only reports dealing with the workings carried out by the CRAVEN MOOR MINING CO., which have been seen in the issues of the Mining Journal which were available for inspection.

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YORKSHIRE DALES AREA

Burhill mine 5 February 1859. The mine is near Pateley Bridge, adjoining the Craven Moor mine. At a depth of only 15 feet from surface, two men got upwards of 120 bings of lead ore last month, and last week, 7 bings in 3½ hours. This mine is on the estate of Mr. John Yorke, Bewerley Hall, Pateley Bridge.

West Bolton Gill mine 5 February 1859. This mine is near the Keldheads mine, in Wensleydale, and is now raising considerable quantities of ore.

Wharfedale mine 5 February 1859. The water wheel and crusher at this mine are now erected.

Wet Grooves mine 5 February 1859. The dip of the vein is causing the ore to go down below the present level. Another level can be driven, 15 fathoms lower. Carbon dioxide gas in the workings here is causing some trouble.

Old Providence mine 19 February 1859. This mine, the location of which is not certain, continues to bear out the improvement which took place recently. It is probably near the Providence mine.

Mossdale mine 19 February 1859. This mine is near the Old Providence mine, referred to above, and continues to do well. Ore is being raised from the North vein.

Wharfedale (late New Providence) mine 5 March 1859. This Company, who have worked with spirit for some time, and who have erected machinery and got it to work, have cut a rich mine in a crosscut which was ordered to be put in some time ago, by Captain William Craig.

Mossdale mine 5 March 1859. During the last quarter, about 100 tons of lead ore have been got out of the North Mossdale vein, (or Coniston Out Moor vein), which seems likely to be a very successful one.

Old Providence mine 5 March 1859. They continue to get lead ore out of the vein cut a little while ago in the Eight Fathoms limestone, of which we informed you a few weeks since. The ore still continues to go down, and the mine should soon be paying dividends.

The three mines last described above are all situated on ground adjoining the Grassington mines, which have been so productive and profitable to the [19] Duke of Devonshire.

Wet Grooves mine 16 April 1859. This mine has been badly hampered during the last six weeks by accumulations of carbon dioxide gas, a result of the depressed weather conditions. It is hoped that the position will improve with the finer spring weather. The mine has been doing well up to this time.

Merryfield mine 14 May 1859. The mine is being drained by opening out and driving on the bottom level, which will enable them to get out the solid rib of ore which they cut above without the expense of working the engine to pump out the water, which will save £60 to £70 per month. The level will take about 12 months to drive, and is being driven at the rate of 6 feet per week.

Cowden Rake mine 21 May 1859. When the shaft had been sunk about 47½ fathoms, they cut into a quantity of spar, supposed to be part of a vein, as it let out much water and prevented further sinking. A crosscut has been made from the shaft at about 34 fathoms depth, and another vein has been

cut and found to be large, but not rich enough to pay for working. They now intend to continue the shaft sinking.

Nidderdale mines 4 June 1859. Two hoisting engines are to be purchased, one for Sir Thomas White's shaft, and one for sinking at Holebottom shaft, which is partly sunk and has holed into Perseverance level. Perseverance level is to be driven forward after the shaft has been equipped.

Merryfield mine 11 June 1859. They are driving the low level at a good speed, which level will drain all the workings to a good depth, when completed.

Appletreewick mines 18 June 1859. These mines are situated about eight miles north-east of Skipton, on the Bewerley Hall Estate. They commenced operations on a small scale about two years ago, and 120 tons of ore were raised and smelted in the past year. In the deep adit level, a good course of ore has been met with, from 3 to 4 feet wide. The mine is now being worked to a profit, and holds future promise.

Nidderdale mines 25 June 1859. Operations were commenced on Monday, 20th June, in Ebenezer level, where it is expected that ore will be found in a short time.

Burhill mines 2 July, 1859. 170 tons of ore were raised in the past twelve months.

Sun Side and Cockhill mines 2 July 1859. A small engine is being put in underground to pump the water from the Rake vein.

Wet Grooves mine 10 September 1859. They are driving on the new level to ventilate the mine, and have found lead ore in it, some lumps weighing up to one hundredweight. The ground is much confused.

[20]

Nidderdale mines 10 September 1859. They have already sunk an air shaft, which effectually ventilates the workings at Sir Thomas White's shaft, and are driving on the Wonderful level, in which a promising vein was cut on 6th September, from which they are now raising good bouse ore. Holebottom shaft has been cleared out to a considerable depth, and zinc pipes are being fixed in Perseverance level to ventilate it. This level will be cleared out and driven on as fast as possible.

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[21]